Remarks

Summary of Rejections

In ¶2 of the Office action, claims 1, 4-6, 8-12, 18, 19, and 21-24 have been rejected under 35 USC §102(b) as being anticipated by Pickens '003 (US Patent 5,455,003).

In ¶4 of the Office action, claims 2, 3, 7, 13-15, and 20 have been rejected under 35 USC§103(a) as being obvious in light of Pickens '003.

In ¶5 of the Office action, claims 16 and 17 are rejected under 35 USC§103(a) as being obvious in light of Pickens '003 in view of Rioja et al (US 5,137,686).

Legal Precedent Regarding Sections 102 and 103

It is axiomatic that anticipation under §102 requires the prior art reference to disclose each and every element of the claim to which it is applied. *In re King,* 801 F.2d 1324, 1326, 231 USPQ 36, 138 (Fed. Cir. 1986). Thus, there must be no differences between the subject matter of the claim and disclosure for the prior art reference. Stated another way, the reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary of the rule is equally applicable: absence from the applied reference of any claimed element negates anticipation. *Kloster Speedsteel AB v. Crucible Inc.,* 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Under § 103, a patent may not be obtained though the invention is not identically disclosed or described as set forth in §102 if the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. 35 U.S.C. § 103(a). In determining differences between the prior art and the claims, the question under section 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530 (Fed. Cir. 1983), *emphasis added.* Moreover, the prior art must also be considered as a whole, including disclosures that would teach away from the claimed invention. *W.L. Gore & Associates, Inc., v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983).

The language "obvious at the time the invention was made" has been held by the Courts to mean that it is inappropriate for the Examiner to use "hindsight" in determining obviousness. *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082 (Fed. Cir.1985). The Court in *In re Vaeck* held that "a proper analysis under § 103 requires, inter alia, consideration of two factors: (i) whether there is some suggestion or motivation, either in the reference themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings and (ii) whether the prior art would have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success. Both the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant's disclosure". *In re Vaeck,* 947 F.2d 488 (Fed. Cir. 1991).

Argument

1. Applicants respectfully traverse the rejection of the pending claims in the instant application. First, the invention as claimed is not anticipated by Pickens '003 as asserted in ¶2 of the office action: each and every element of the invention as claimed is not found in Pickens.

2. Second, a *prima facie* case for obviousness has not been met; although the range elements of the claims do overlap in part, at a minimum the limitation "wherein the Cu and Mg are present in the alloy in a total amount below a solubility limit of the alloy" is not disclosed or suggested by Pickens '003 as asserted in ¶4 of the office action.

3. Finally, Rioja et al. is similarly deficient in this regard, as it also fails to disclose or suggest the above-mentioned limitation as asserted in ¶5 of the office action.

A. Pickens '003's Cryogenic Alloy Related Disclosures Do Not Teach or Disclose Every Element of the Claims as Asserted in ¶2 of the Office Action

4. The inventive alloy of the present invention provides significantly improved combinations of fracture toughness, strength and damage tolerance, i.e. fatigue crack growth resistance.

5. This is accomplished through the addition of ancillary amounts of lithium to the alloy while keeping the Cu and Mg amounts below the solubility limit of the alloy.

6. Here, the instant rejection is based on the assumption that any given amount of alloying elements added to aluminum would have the same solubility limits.

7. This is not the case. As is taught in the application in ¶26, "The term "solubility limit" means the maximum amount of alloying additions that can be made to the aluminum alloy while remaining as a solid solution in the alloy at a given temperature. For example, the solubility limit for the combined amount of Cu and Mg is the point at which the Cu and/or Mg no longer remain as a solid solution in the aluminum at a given temperature. The temperature may represent a practical compromise between thermodynamics phase diagram data and furnace controls in the manufacturing environment."

8. In other words, the processing temperatures and practical use temperatures may be understood to be important considerations to those of ordinary

skill would understand to be an important part of determining the solubility limits for a given alloy.

9. Accordingly, Pickens '003's disclosure of cryogenic alloys for use as storage tanks for liquefied hydrogen or oxygen would not necessarily disclose each and every element of the invention as claimed to one of ordinary skill in the art. As is described throughout Pickens 003, these alloys typically are used at temperatures of about -196°C. Thus, one would expect significantly reduced solubility of Mg and Cu, as well as that of other alloying elements, such that this limit would or could be exceeded by the amounts of Cu and Mg shown in example Q of Pickens '003. In short, it is neither disclosed or suggested that the alloy system of Pickens '003, in particular example Q, would possess amounts of Cu and Mg below the solubility limits of the alloy.

10. Accordingly, claim 1 is not anticipated by Pickens '003, as an element of the claim is not found in the prior art reference as is required by the legal standards for §102 rejections. Claims 4-6, 8-12, 18, 19 and 21-24 depend from claim 1, and are similarly not anticipated by the disclosure of Pickens '003.

11. Applicants therefore request withdrawal of the

B. Pickens '003's Cryogenic Alloys Do Not Make Obvious the Alloys of the Present Invention as Asserted in ¶4 of the Office Action

12. Although Perkins may disclose a test sample near the ranges claimed, as well as broadly claim a wide range of alloys, Perkins does not teach or

suggest using the ranges now claimed in claims 2, 3, 7, 13-15 and 20, e.g. having about 0.1 to 0.8 Li, (claim 2), about 0.2 to about 0.7 Li (claim 3) etc.

13. First, as noted above, although the alloying element limitation elements of the claims do overlap in part with the weight percentage disclosures of Perkins '003, there is no disclosure in Perkins that alloys it teaches have Cu and Mg at levels below the solubility limits of the alloy. Since not all of the elements are present in the reference, the implication that overlapping ranges equate to a *prima facie* case of obviousness is incorrect, and a motivation for those of ordinary skill to modify the reference is necessary for such a case to be made.

14. Perkins 003 does not supply such a motivation. Instead. Perkins '003 teaches the importance of the amounts of Cu and Li, not Cu and Mg as in the present invention. "In accordance with the present invention, the desirable cryogenic fracture toughness trend can be achieved by controlling Cu and Li levels... The desirable trend can be achieved for Cu levels of from about 2.0 to about 6.5% and lithium levels from about 0.2 to about 2.7%." Perkins, col. 17, 25

15. In addition, Perkins teaches that Cu and Li, not Cu and Mg, should be manipulated in order to control the properties of its alloys (strength, fracture resistance) at cryogenic temperatures like -196°C. "The amounts of Cu and Li employed are interdependent. For example for copper levels at the high end of the broad range, e.g., 6.5%R, the level of lithium should be close to about 1.0% to achieve the desirable cryogenic fracture toughness trend at high strength levels. At

the lower end of the broad Cu range, e.g., 2/0%, more Li can be present but the highest strengths attainable will conversely be lower..." Perkins '003, col 17, 44-50, emphasis added. Perkins further teach that "the highest strengths are attained with Li levels from about 1.05 to about 1.35%, a peak at 1.2% lithium." Id. col 17, 60-65. In short, although Perkins might disclose a test sample near the ranges claimed, and further broadly claim a wide range of alloys, Perkins does not teach or suggest using the ranges now claimed in claims 2, 3, 7, 13-15 and 20.

16. In fact, given the its express teaching regarding the "peak" strength with Li at 1.2 wt%, Perkins'003 teaches away from using the much lower amounts of Li claimed in claims 2 (0.8 max) and claim 3 (0.7 max) respectively.

C. Rioja, et al. Provides Neither the Missing Element nor the Motivation to Combine

17. Similarly, nothing in Rioja, et al. would motivate one to combine its teachings with those of Perkins '003. First, Rioja primarily concerns aerospace Al-Li alloys, not cryogenic alloys. Therefore, absent a motive to combine, the combination of Rioja with Perkins is itself improper. Second, nothing in Rioja deals with or teaches the relationship of Cu and Mg, nor the element of keeping the Cu and Mg levels below the solubility limit. Therefore, even if combined with Perkins, would not render obvious the present invention as claimed in claims 16 and 17.

It is respectfully submitted that the present application is in condition for allowance. If the Examiner would like to suggest changes of a formal nature to place this application in better condition for allowance, a telephone call to Applicants' undersigned attorney would be appreciated.

Respectfully submitted,

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